AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) An electro-optical voltage sensor for measurement of an electrical voltage V, the voltage V being present between two electrodes ~~(3, 4)~~ and generating an electric field, the electrodes ~~(3, 4)~~ being arranged in a manner spaced apart from one another, and an electro-optically active medium ~~(1)~~ being arranged between the electrodes ~~(3, 4)~~, into which medium light ~~(5)~~ can be radiated, it being possible to influence the state of polarization of said light in the electro-optically active medium ~~(1)~~ by means of the electric field and to detect it after emergence from the electro-optically active medium ~~(1)~~, it being possible to determine the voltage V from the detected state of polarization,

~~characterized in that~~ wherein

a distance medium ~~(2)~~ is arranged between the two electrodes ~~(3, 4)~~, the electro-optically active medium ~~(1)~~ being arranged with an effective thickness d1 and the distance medium ~~(2)~~ with an effective thickness d2 between the two electrodes ~~(3, 4)~~ and the effective thicknesses d1, d2 being chosen in such a way that temperature influences on the detected state of polarization of the light ~~(5)~~ are essentially compensated for.

2. (Currently Amended) The voltage sensor as claimed in claim 1, ~~characterized in that~~ wherein the effective thickness d2 of the distance medium ~~(2)~~ and the effective thickness d1 of the electro-optically active medium ~~(1)~~ are chosen in such a way that the influences of the temperature dependences of temperature-dependent material constants of the distance medium ~~(2)~~ and of the electro-optically active medium ~~(1)~~ on the detected state of polarization of the light ~~(5)~~ are essentially compensated for.

3. (Currently Amended) The voltage sensor as claimed in claim 2, ~~characterized in that~~ wherein the temperature-dependent material constants are

- critical electro-optical coefficients (k),
- dielectric constants (ε) and
- thermal expansion coefficients (α).

4. (Currently Amended) The voltage sensor as claimed in claim 1 ~~or 2, characterized in that~~ , wherein the effective thickness d2 of the distance medium ~~(2)~~ and the effective thickness d1 of the electro-optically active medium ~~(1)~~ are chosen in such a way that the influences of the temperature dependences of the dielectric constant $\varepsilon 1$ of the electro-

optically active medium ~~(1)~~ of the dielectric constant ε2 of the distance medium ~~(2)~~ and,

- if the distance medium ~~(2)~~ is not electro-optically active or the light ~~(5)~~ does not radiate through the distance medium ~~(2)~~: of the critical electro-optical coefficient k1 of the electro-optically active medium ~~(1)~~, and

- if both the electro-optically active medium ~~(1)~~ and the distance medium ~~(2)~~ are electro-optically active and light ~~(5)~~ is radiated through them: of the critical electro-optical coefficient k1 of the electro-optically active medium ~~(1)~~ and of the critical electro-optical coefficient k2 of the distance medium ~~(2)~~,

on the detected state of polarization of the light ~~(5)~~ essentially cancel one another out.

5. (Currently Amended) The voltage sensor as claimed in claim 4, ~~characterized in that~~ <u>wherein</u> the following holds true:

$$d_1 \cdot [(\partial k_1 / \partial T) \cdot E_1 + k_1 \cdot (\partial E_1 / \partial T)] + d_2 \cdot [(\partial k_2 / \partial T) \cdot E_2 + k_2 \cdot (\partial E_2 / \partial T)] \approx 0$$

if the light ~~(5)~~ also radiates through the distance medium ~~(2)~~, and:

$$(\partial k_1 / \partial T) \cdot E_1 + k_1 \cdot (\partial E_1 / \partial T) \approx 0$$

if the light ~~(5)~~ does not radiate through the distance medium ~~(2)~~ or the latter is not electro-optically active;

where E1 is the electric field strength in the electro-optically active medium ~~(1)~~ and E2 is the electric field strength in the distance medium ~~(1)~~,

and in particular where the aforementioned electric field strengths are approximated as

$$E1 \approx \varepsilon 2 \cdot V/(\varepsilon 2 \cdot d1+\varepsilon 1 \cdot d2) \text{ and}$$

$$E2 \approx \varepsilon 1 \cdot V/(\varepsilon 2 \cdot d1+\varepsilon 1 \cdot d2)$$

6. (Currently Amended) The voltage sensor as claimed in ~~one of the preceding claims, characterized in that~~ claim 1, wherein the distance medium ~~(2)~~ is transparent and of a solid state of aggregation, and in that the light radiates through both the distance medium ~~(2)~~ and the electro-optically active medium ~~(1)~~.

7. (Currently Amended) The voltage sensor as claimed in ~~one of the preceding claims, characterized in that~~ claim 1, wherein the distance medium ~~(2)~~ has a vanishing critical electro-optical coefficient k2 and/or a vanishing temperature dependence $\partial k2/\partial T$ of its critical electro-optical coefficient k2, and in particular has a negligible temperature dependence $\partial \varepsilon 2/\partial T$ of its dielectric constant $\varepsilon 2$.

8. (Currently Amended) The voltage sensor as claimed in ~~one of the preceding claims, characterized in that~~ claim 1, wherein a stack of N elements of the electro-optically active medium ~~(1)~~ and N+1 elements of the distance medium ~~(2)~~ is arranged between the electrodes ~~(3, 4)~~, N being an integer where $N \geq 1$, and an element of the electro-optically active medium ~~(1)~~ in each case being arranged between two adjacent elements of the distance medium ~~(2)~~, the first and the last element in the stack being in

contact with a respective one of the two electrodes ~~(3, 4)~~ and, in particular, each of the elements being essentially cylindrical with essentially the same cylinder diameter.

9. (Currently Amended) The voltage sensor as claimed in claim 8, ~~characterized in that~~ wherein the elements of the electro-optically active medium ~~(1)~~ have such an effective thickness and are arranged between the electrodes ~~(3, 4)~~ in such a way that a deviation between the voltage determined by means of the voltage sensor and the voltage V to be measured is minimal.

10. (Currently Amended) The voltage sensor as claimed in claim 8, ~~characterized in that~~ wherein the elements of the electro-optically active medium ~~(1)~~ all have the same effective thickness $\delta 1 = d1/N$, and ~~in that~~ wherein either

(a) the elements of the distance medium ~~(2)~~ have an effective thickness $\delta 2 = d2/N$, but the outer two elements of the distance medium ~~(2)~~ in the stack have an effective thickness $\delta 2' = d2/(2 \cdot N)$, or ~~in that~~ wherein

(b) the elements of the distance medium ~~(2)~~ have an effective thickness $\delta 2 = d2/(N+1)$.

11. (Currently Amended) The voltage sensor as claimed in ~~one of the preceding claims, characterized in that~~ claim 1, wherein the

electrodes ~~(3, 4)~~ together with the electro-optically active medium ~~(1)~~ and the distance medium ~~(2)~~ are cast in silicone ~~(15)~~.

12. (Currently Amended) The voltage sensor as claimed in ~~one of the preceding claims, characterized in that~~ claim 1, wherein the electrodes ~~(3, 4)~~ together with the electro-optically active medium ~~(1)~~ and the distance medium ~~(2)~~ are cast in silicone, the silicone in the region of the electrodes ~~(3, 4)~~, of the electro-optically active medium ~~(1)~~ and of the distance medium ~~(2)~~ being formed essentially in cylindrical or barrel-shaped fashion with a diameter which is between 1.1 and 6 times, in particular between 2 and 4 times, as large as a maximum radial extent of the electrodes ~~(3, 4)~~.

13. (Currently Amended) The voltage sensor as claimed in claim 11 ~~or 12, characterized in that~~ , wherein the silicone ~~(15)~~ in the region of the electrodes ~~(3, 4)~~, of the electro-optically active medium ~~(1)~~ and of the distance medium ~~(2)~~, is formed essentially in cylindrical or barrel-shaped fashion, and the electrodes ~~(3, 4)~~ have electrically conductive voltage feeds ~~(3b, 4b)~~, which are formed essentially in rod-type fashion and are likewise cast in silicone, the silicone ~~(15)~~ in the region of the voltage feeds ~~(3b, 4b)~~ being formed essentially in cylindrical fashion and having a smaller diameter than in the region of the electrodes ~~(3, 4)~~, of the electro-optically active medium ~~(1)~~ and of the distance medium ~~(2)~~, and, in particular, ~~in that~~ wherein the silicone has a shielding on the outside.

14. (Currently Amended) The voltage sensor as claimed in ~~one of the preceding claims, characterized in that~~ claim 1, wherein the electro-optically active medium ~~(1)~~ is crystalline BGO which is oriented with its ~~[001]~~ direction parallel to the direction of propagation of the light ~~(5)~~, ~~in that~~ wherein the direction of propagation of the light ~~(5)~~ essentially runs along the electric field generated by the voltage V, and in that the distance medium ~~(2)~~ is fused silica.

15. (Currently Amended) A method for measurement of an electrical voltage V, the voltage V being present between two electrodes ~~(3, 4)~~ arranged in a manner spaced apart from one another and generating an electric field, light ~~(5)~~ being radiated into an electro-optically active medium ~~(1)~~ arranged between the electrodes ~~(3, 4)~~, a state of polarization of the light ~~(5)~~ being influenced in the electro-optically active medium ~~(1)~~ by means of the electric field and the light being detected after emergence from the electro-optically active medium ~~(1)~~ and the voltage V being determined from the detected state of polarization,

~~characterized in that~~ wherein

a distance medium ~~(2)~~ is arranged between the two electrodes ~~(3, 4)~~, an effective thickness d2 of the distance medium ~~(2)~~ and an effective thickness d1 of the electro-optically active medium ~~(1)~~ being chosen in such a way that temperature influences on the detected state of polarization of the light ~~(5)~~ are essentially compensated for.